



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Memorandum

Subject: Annual Monitoring Network Plans

From: Matthew Lakin, Manager
Air Quality Analysis Office, Air Division, Region 9

To: Region 9 Air Pollution Control Agencies

EPA first required submission of Annual Monitoring Network Plans in 2007. The plans require each agency to evaluate its existing network and discuss upcoming changes, and also allow the public and EPA to understand the monitoring network. To assist state and local agencies in meeting this new requirement, EPA Region 9 issued an "Annual Monitoring Network Plan for 2007" memo outlining the information that was required to be submitted as part of the annual plans. Since that time, EPA Region IX has reviewed over 100 annual network plans and has observed some widespread opportunities for improvements. In addition, there have been several changes to the monitoring requirements detailed in 40 CFR Part 58. This memo includes clarifications to pre-existing plan elements in an effort to promote consistent and thorough plans and also provides updated information reflecting changes in regulation since 2007.

We recognize that this memo is being sent only a few months before plans are due, and that agencies typically produce plans well ahead of July 1st in order to provide time for internal review and public notice and comment. We thank you for the time and attention paid each year when you develop these documents. We hope that you will be able to address the elements noted in this memo in your plans submitted this year, and will expect that all elements will be addressed in plans submitted in 2013.

The following bulleted list includes those elements where we have observed inconsistency in the network plans. Please review the list, along with supporting materials as needed, to ensure that these elements are included in a way that is consistent with EPA requirements.

- **Minimum Monitoring Requirements.** Agencies should provide the information detailed in Attachment A to this memo, including information on design values and CBSAs/MSAs.
- **Basic Site Information:** The network plans should include a description of each site and the purpose for monitoring each pollutant.

- **Maps and Photographs:** EPA encourages the use of a map or maps in the network plan to help describe the geographic distribution of each type of monitor throughout the jurisdiction, as well as photographs of each site to provide visual siting information.
- **PM_{2.5} Collocation.** Network plans should contain information on how collocation requirements are being met. See Attachment B to this memo for an explanation of collocation requirements.
- **Detailed Site and Monitor Information tables.** While all network plans include site and monitor information tables, agencies should ensure that all required information is provided. We recommend using the template provided as Attachment C to this memo, which is an updated version of the table included in the template with the 2007 memo. Specific examples of required information include:
 - Monitoring objective, site type, monitor type, method code, parameter code and parameter occurrence code (POC) for each monitor (see Attachment D for descriptions).
 - Sampling Frequency for PM_{2.5} and PM₁₀ sites. Sampling frequencies should be determined in accordance with 40 CFR 58.12. For easy reference, Attachments E and F to this memo describe how sampling frequency should be determined.
 - PM_{2.5} information. When filling out the detailed site and monitor information tables (e.g., Attachment C to this memo), agencies should ensure that PM_{2.5} information is correct. This includes clearly identifying method code, FEM/FRM/non-FEM/non-FRM status, which monitors are being used to meet collocation requirements (see Attachment B), and whether data are comparable to the NAAQS.
- **Reporting Continuous PM_{2.5} Data.** Please refer to the memo dated June 1, 2006, titled “Technical Note on Reporting PM_{2.5} Continuous Monitoring and Speciation Data to the Air Quality System (AQS)” for guidance on reporting continuous PM_{2.5} data into AQS. The memo includes parameter codes for both FEM and non-FEM continuous PM_{2.5} instruments which should be included in the Annual Network Plan. The following is a link to the June 1, 2006 memo:
<http://www.epa.gov/ttn/amtic/files/ambient/pm25/datamang/contrept.pdf>
- **Non-regulatory PM_{2.5} Monitors.** If an FRM or FEM monitor is designated as not comparable to the NAAQS (specified by a non-regulatory monitor type or a parameter code of 88501 or 88502 in AQS), justification should be given in the Annual Network Plan. The choice of 88501 or 88502 for non-FEM monitors should also be discussed in the network plan. Guidance on this topic can be found in the June 1, 2006 memo referenced above as well as the July 24, 2008 memo titled “Implementing Continuous PM_{2.5} Federal Equivalent Methods (FEMs) and Approved Regional Methods (ARMs) in State or Local Air Monitoring Station (SLAMS) Networks”. The following is a link to the July 24, 2008 memo:
<http://www.epa.gov/ttn/amtic/files/ambient/pm25/femarmslam.pdf>

As noted above, there have been several changes to monitoring requirements since EPA Region 9’s memo from 2007 that may require modifications to annual network plans. The

specific requirements as of August 2011 are included as Attachment G, “CFR Elements.”

General changes include new:

- NCore requirements (stations operational by January 1, 2011).
- Pb requirements: source-oriented (1.0 tpy or greater – monitors operational by January 1, 2010; 0.50 tpy – monitors by December 27, 2011), airport study monitors (by December 27, 2011), at urban NCore stations (population of 500,000 or greater – by January 1, 2012).
- SO₂ requirements: number of required monitors is based on the Population Weighted Emissions Index (PWEL) (operational by January 1, 2013).
- NO₂ requirements (address in July 1, 2012 plan).
- CO requirements: in CBSAs of 2.5 million persons or more (address in July 1, 2014 plan); other CO monitors (address in July 1, 2016 plan).

Attachments

Attachments A through G to this memo outline requirements and provide clarification on specific plan elements that may be improved. Attachments A, B and C provide suggested table formats for State and local agencies to use when reporting minimum monitoring requirements, collocation requirements, and detailed site and monitor information, respectively. Although agencies are not required to include the exact tables in these attachments, their use ensures that all relevant information is being included, as well as standardizing how plans present information. Regardless of how the information is presented, agencies must ensure that their network plans include all required information. Attachments D through G provide reference material that helps in assembling this information.

Attachment A provides suggested table templates for agencies to report minimum monitoring requirements and design values where appropriate for each of the criteria pollutants. This information is similar the information that was provided in 2007 but with some additions and clarifications as described in the Attachment.

Attachment B provides suggested table templates for collocation requirements and describes collocation requirements for PM₁₀, PM_{2.5}, and Pb. This is a new table from what was provided with the 2007 memo.

Attachment C provides a suggested template for detailed site and monitor specific information to be reported. This table is similar to the one provided in the template with the 2007 memo, but has been updated to reflect new/improved information.

Attachment D provides a reference sheet for monitoring objectives, site types, monitor types, method and parameter codes for each monitor.

Attachment E outlines sampling frequency requirements for manual PM_{2.5} samplers.

Attachment F outlines sampling frequency requirements for PM₁₀ samplers.

Attachment G provides the regulatory basis for the Annual Monitoring Network Plan. Agencies are also encouraged to include additional information that describes their ambient air monitoring network.

General Network Plan Overview

Submittal date: States must submit an annual network plan on July 1st of each year (beginning in 2007) to the Regional Administrator. State and local agencies should provide a copy of the submittal to the Air Quality Analysis Office Manager.

Public Inspection/Comment: The annual monitoring network plan must be made available for public inspection (website, hardcopy posting in libraries and public offices, and/or newspaper listing) for at least 30 days prior to submission to EPA. If an opportunity for public comment had been provided, comments received must be included in the annual network plan submission.

Types of Monitors to include in plan: Include establishment and maintenance of an air quality surveillance system that consists of the following:

1. State or Local Air Monitoring Stations (SLAMS).
2. Federal Reference Method (FRM).
3. Federal Equivalent Method (FEM).
4. Approved Regional Method (ARM).
5. National Core Multipollutant Monitoring Stations (NCORE).
6. Speciation Trends Network (STN).
7. Photochemical Assessment Monitoring Stations (PAMS).
8. Special Purpose Monitor (SPM).

Network modifications: A network plan that proposes SLAMS network modifications including new monitoring sites is subject to the approval of the EPA Regional Administrator according to 40 CFR 58.14. If you are requesting approval for modifications as part of your network plan, please include a demonstration of how the criteria in 40 CFR 58.14 have been met.

We look forward to your network plan submittals. Please contact me, Matthew Lakin, at (415) 972-3851 or lakin.matthew@epa.gov, or any of my monitoring team staff, should you have any questions.

Attachments

ATTACHMENT A

This attachment provides an update to the “Minimum Monitoring Requirements” section originally introduced as part of the network plan template that was released with 2007 network plan memo. Several updates have been made to these tables in order to further clarify the number of minimum required monitors. Additional tables have been created for PM_{2.5}, NO₂, SO₂, CO, and Pb. The included sample tables can be incorporated into the annual monitoring network plan to display how an agency is assessing and meeting the minimum monitoring requirements for each of the criteria pollutants. EPA recommends that agencies designate a single section in their network plan that provides the analyses of minimum monitoring requirements for their jurisdiction. It is also good for agencies to note that in some cases although the regulation may already be in place, monitoring requirements may not come into play until after the date the submitted network plan is intended to cover (e.g. CO near-road monitoring does not come into effect until 2015 and 2017 according to 40 CFR 58.13(e)).

Comment [EF1]: Meredith, I’ve inserted this language in order to try and highlight what is different from these tables compared to the 2007 memo. Let me know if you think this should be refined.

Minimum Monitoring Requirements.

State whether or not this network meets the minimum monitoring requirements for all criteria pollutants.

Comment [EF2]: In order to make this attachment look more like the 2007 memo, I have re-inserted this here and modified the language a bit. In the previous version of this attachment, I had this in the intro description above.

Ozone

(Note: Refer to section 4.1 and Table D-2 of Appendix D to 40 CFR Part 58)

Table 1. Minimum Monitoring Requirements for Ozone.

MSA	County(ies)	Population & Census year	8-hr Design Value [ppb], DV Years ¹	Design Value site (name, AQS ID)	# Required Monitors	# Active Monitors	# Additional Monitors Needed

¹DV Years = the three years over which the design value (DV) was calculated (e.g., 2008-2010)

Monitors required for SIP or Maintenance Plan:

PM_{2.5}

(Note: Refer to sections 4.7.1, 4.7.2 and Table D-5 of Appendix D to 40 CFR Part 58)

Table 2a. Minimum Monitoring Requirements for PM_{2.5} SLAMS. (FRM/FEM/ARM, see 40CFR 58 App D Section 4.7.1 and Table D-5)

MSA	County(ies)	Population & Census year	Annual Design Value [µg/m3], DV Years ¹	Annual Design Value site (name, AQS ID)	Daily Design Value[µg/m3], DV years	Daily Design Value site (name, AQS ID)	# Required SLAMS Monitors	# Active SLAMS Monitors	# Additional SLAMS Monitors Needed

¹DV Years = the three years over which the design value (DV) was calculated (e.g., 2008-2010)

Table 2b. Minimum Monitoring Requirements for continuous PM_{2.5} monitors. (FEM/ARM and non-FEM, see 40CFR 58 App D Section 4.7.2)

MSA	County(ies)	Population & Census year	Annual Design Value [µg/m ³], DV Years ¹	Annual Design Value site (name, AQS ID)	Daily Design Value[µg/m ³], DV years	Daily Design Value site (name, AQS ID)	# Required Continuous Monitors	# Active Continuous Monitors	# Additional Continuous Monitors Needed

¹DV Years = the three years over which the design value (DV) was calculated (e.g., 2008-2010)

Monitors required for SIP or Maintenance Plan:

PM₁₀

(Note: Refer to section 4.6 and Table D-4 of Appendix D to 40 CFR Part 58)

Table 3. Minimum Monitoring Requirements for PM₁₀.

MSA	County(ies)	Population & Census year	Design Concentration* [µg/m ³], DV Years ¹	Design Concentration* site (name, AQS ID)	# Expected Exceedances (years)	# Required Monitors	# Active Monitors	# Additional Monitors Needed

*see Section 6.3 of the *PM₁₀ SIP Development Guideline* (EPA-450/2-86-001): <http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1006IKV.txt>

¹DV Years = the three years over which the design value (DV) was calculated (e.g., 2008-2010)

Monitors required for SIP or Maintenance Plan:

NO₂

(Note: Refer to section 4.3 of Appendix D to 40 CFR Part 58)

Table 4. Minimum Monitoring Requirements for NO₂.

CBSA	Population & Census year	Max AADT counts (year)	# Required Near-road Monitors	# Active Near-road Monitors	# Additional Near-road Monitors Needed	# Required Area-wide Monitors	# Active Area-wide Monitors	# Additional Area-wide Monitors Needed

Monitors required for SIP or Maintenance Plan:

Monitors required for PAMS:

EPA Regional Administrator-required monitors per 40 CFR 58, App. D 4.3.4:

SO₂

(Note: Refer to section 4.4 of Appendix D to 40 CFR Part 58)

Table 5. Minimum Monitoring Requirements for SO₂.

CBSA	County(ies)	Population & Census year	Total SO ₂ ¹ [tons/year]	Population Weighted Emissions Index ² [million persons-tons per year]	# Required Monitors	# Active Monitors	# Additional Monitors Needed

¹Using NEI data

²Calculated by multiplying CBSA population and total SO₂ and dividing product by one million

Monitors required for SIP or Maintenance Plan:

EPA Regional Administrator-required monitors per 40 CFR 58, App. D 4.4.3:

CO

(Note: Refer to section 4.2 of Appendix D to 40 CFR Part 58)

Table 6. Minimum Monitoring Requirements for CO.

CBSA	Population & Census year	# Required Near- Road Monitors	# Active Near-Road Monitors	# Additional Monitors Needed

Monitors required for SIP or Maintenance Plan:

EPA Regional Administrator-required monitors per 40 CFR 58, App.D 4.2.2:

Pb

(Note: Refer to section 4.5 of Appendix D to 40 CFR Part 58)

Table 7a. Minimum Monitoring Requirements for Pb at NCore.

NCore Site (name, AQS ID)	CBSA	Population & Census year	# Required Monitors	# Active Monitors	# Additional Monitors Needed

Table 7b. Source-Oriented Pb Monitoring (including airports)

Source Name	Address	Pb Emissions (tons per year)	Emission Inventory Source & Data Year	Max 3-Month Design Value* [µg/m ³]	Design Value date (third month, year)	# Required Monitors	# Active Monitors	# Additional Monitors Needed

*consider data from the past 3 years.

Monitors required for SIP or Maintenance Plan:
EPA Regional Administrator-required monitors per 40 CFR 58, App. D 4.5(c):

ATTACHMENT B

This attachment describes how to determine the number of collocated monitors required by 40 CFR 58 Appendix A, Section 3 for PM_{2.5}, PM₁₀, and Pb networks at the Primary Quality Assurance Organization (PQAO) level. The included sample tables can be incorporated into the annual monitoring network plan to display how an agency is assessing and meeting these collocation requirements. Monitors satisfying the collocation requirements should also be identified as a "QA collocated" monitor type in the detailed site information section of an Agency's Annual Network Plan (see Attachment C of this memo for a template which includes this information).

Template for documenting collocation of PM_{2.5}, PM₁₀, and source-oriented Pb FRM networks:

Method Code	# Primary Monitors	# Required Collocated Monitors	# Active Collocated Monitors

Template for documenting collocation of PM_{2.5} FEM network:

Method Code	# Primary Monitors	# Required Collocated Monitors	# Active Collocated FRM Monitors	# Active Collocated FEM Monitors (same method designation as primary)

PM_{2.5} Collocation as described in 40 CFR 58 Appendix A, Sections 3.2.5 & 3.3.5

- Since the collocations requirements applies to primary monitoring networks and on a method basis, it is helpful to make a list of all PM_{2.5} primary monitors grouped by method designation, specifically, by each FRM method, and by each FEM method.
- For **each FRM method** designated (considering primary monitors only):
 - Collocate at 15 percent of monitors (values of 0.5 or greater round up).
 - Must have at least one collocated monitor per PQAO.
 - Collocated monitor must be same FRM method designation as the primary monitor.
- For **each FEM method** designated (considering primary monitors only):
 - Collocate at 15 percent of monitors (values of 0.5 or greater round up) or at least one collocated monitor.
 - The first collocated monitor must be an FRM.
 - Half of collocated monitors must be FRMs, and half must be the same FEM method as the primary monitor.
 - If an odd number of collocated monitors are required, the additional monitor must be a FRM.
- Collocated FRM samplers are required to run on at least a 12-day sampling frequency.
- 80 percent of the collocated samplers should be located at sites that have DVs within ± 20 percent of either the annual or 24-hour PM_{2.5} NAAQS.
- If an agency has no sites within ± 20 percent of either the annual or 24-hour PM_{2.5} NAAQS, 60 percent of the collocated monitors should be located at sites with annual mean concentrations among the 25 percent highest in the network.
- PM_{2.5} samplers used in the PM_{10-2.5} network may be counted to fulfill collocation requirements as long as the samplers are of the same method designation.
- In addition to the requirements in 40 CFR 58 Appendix A, Section 3.2.5, 40 CFR 58 Appendix D, Section 4.7.2 also requires at least one of the continuous PM_{2.5} monitors in each MSA must be collocated with a required FRM/FEM/ARM. If one of the required FRM/FEM/ARM monitor is a continuous FEM or ARM, the collocation requirement in 40 CFR 58 Appendix D, Section 4.7.2 does not apply.

PM₁₀ Collocation as described in 40 CFR 58 Appendix A, Section 3.3.1

- Only manual PM₁₀ samplers are required to meet a collocation requirement.

Comment [KH1]: Changed this from orig (and synthesizes) bc I realized the required # is the only thing we're covering here – noth other requirements like siting distances etc

Comment [KH2]: Took this out since it is repeated in the Pb section below Ref- sentence about NCore Pb

Comment [KH3]: Describes the tables – took language from detailed site tables

Comment [KH4]: This will let use detailed site tables to match the specific sites to the "# active collocated monitors" in the tables below

Comment [KH5]: I added this bc I forgot it the first time

Comment [KH6]: This seems repetitive to me – I would take out the first bullet for brevity

- Each manual method designation in the PQAQ must have 15 percent of monitors collocated. Collocation for TSP and PM₁₀ samplers must be considered separately.
- Each PQAQ with a PM₁₀ network must have at least one collocated PM₁₀ monitor.
- Collocated samplers are required to run on at least a 12-day schedule.
- Collocated sites must be within the highest 25 percent annual mean concentrations, unless alternatives are approved by the Regional Administrator.
- PM₁₀ samplers used in the PM_{10-2.5} network may be counted to fulfill collocation requirements as long as the samplers are of the same method designation.

Pb Collocation as described in 40 CFR 58 Appendix A, Section 3.3.4.3

- PQAQs with only non-source-oriented NCore Pb sites do not have PQAQ minimum collocation requirements. EPA is responsible for coordinating the national collocation requirements that do exist for this network and are established based on 40 CFR Appendix A, Section 3.2.6. Should EPA coordinate with a PQAQ to assist with national Pb network collocation, then the collocated monitor must be of the same method designation as the primary monitor.
- All other PQAQs must implement collocation requirements for Pb following PM₁₀ collocation described above (and in 40 CFR 58 Appendix A, Section 3.3.1) with the exception that the first collocated Pb site selected must be the site measuring the highest Pb concentrations in the network.

ATTACHMENT C

This attachment provides an update to the “Detailed Site Information” section originally introduced as part of the network plan template that was released with 2007 network plan memo. Two major updates have been made to this section from the previous 2007 version: 1) clarification of appropriate units to report for each row, and 2) the addition to report each of the following- POC, parameter code, basic monitoring objective, site type, monitor type, method code (this replaces the sampling and analysis method from the previous version), and FRM/FEM/ARM/other status. This attachment displays a suggested table format for agencies to use to report in their annual monitoring network plan all of the detailed site and monitor specific information for each of the stations in their monitoring network (as required per 40 CFR Part 58.10).

Comment [EF1]: Meredith, this is the section I’ve added to try and explain the differences between this new table and the one presented in the 2007 memo.

Site Name

[Give a broad overview of the site and rationale for its location. Include a description of site and purpose of monitoring for each pollutant. A photograph of the site is encouraged but not required.]

Local site name	Sample Site	
AQS ID (XX-XXX-XXXX)	12-345-6789	
GPS coordinates (decimal degrees)	37.785381, 122.398047	
Street Address	75 Hawthorne Street, San Francisco, CA 94105	
County	San Francisco	
Distance to roadways (meters)	36	
Traffic count (AADT, year)	15,000 (2010)	
Groundcover (e.g. asphalt, dirt, sand, etc.)	Asphalt	
Representative statistical area name (e.g. MSA, CBSA, etc.)	SAN FRANCISCO-OAKLAND-FREMONT Metro Area	
Pollutant, POC	Ozone, 1	PM _{2.5} , 3
Parameter code ¹	44201	88101
Basic monitoring objective(s) ²	NAAQS	NAAQS, research
Site type(s) ³	MAX OZONE	QUALITY ASSURANCE
Monitor type(s) ⁴	SLAMS/PAMS	QA COLLOCATED
Instrument manufacturer and model	2B Technologies 202	Andersen RAAS2.5-200
Method code ⁵	190	128
FRM/FEM/ARM/other	FEM	FRM
Spatial scale (e.g. micro, neighborhood, etc.) ⁶	Urban	Neighborhood
Monitoring start date (MM/DD/YYYY)	01/01/2006	01/01/1999
Operation schedule (e.g. 1:3, continuous, etc.)	continuous	1:3
Sampling season (MM/DD-MM/DD)	01/01-12/31	01/01-12/31
Probe height (meters)	5.3	5.2
Distance from supporting structure (meters)	2.2	2.1
Distance from obstructions on roof (meters)	N/A	N/A
Distance from obstructions not on roof (meters)	25	29
Distance from trees (meters)	35	39
Distance to furnace or incinerator flue (meters)	13	15
Distance between collocated monitors (meters)	N/A	3
Unrestricted airflow (degrees)	360	360
Probe material for reactive gases (e.g. Pyrex, stainless steel, etc.)	Teflon	N/A
Residence time for reactive gases (seconds)	6	N/A
Will there be changes within the next 18 months? (Y/N)	N	Y
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N/A	Y
Frequency of flow rate verification for manual PM samplers ⁷	N/A	monthly
Frequency of flow rate verification for automated PM analyzers ⁷	N/A	N/A
Frequency of one-point QC check for gaseous instruments ⁷	bi-weekly	N/A
Last Annual Performance Evaluation for gaseous parameters (MM/DD/YYYY)	02/28/2012	N/A
Last two semi-annual flow rate audits for PM monitors (MM/DD/YYYY, MM/DD/YYYY)	N/A	07/12/2011; 01/15/2012

¹ Parameter codes may be found at <http://www.epa.gov/ttn/airs/airsaqs/manuals/codedescs.htm>

² Monitoring objectives: public info, NAAQS comparison, research.

³ Site types: extreme downwind, highest conc., max ozone conc., max precursor impact, population exposure, source oriented, upwind background, general/background, regional transport, welfare-related impacts, quality assurance, other.

⁴ Monitor types: IMPROVE, index site, industrial, NATTS, NCORE, non-EPA Federal, PAMS, proposed NCORE, QA Collocated, SLAMS, special purpose, supplemental speciation, trends speciation, tribal monitors, unofficial PAMS.

⁵ Method codes may be found at <http://www.epa.gov/ttn/airs/airsaqs/manuals/codedescs.htm>

⁶ Spatial scales: micro, middle, neighborhood, urban, regional, national, global. See Table D-1 of 40CFR58 App. D for appropriate siting scales for various site types.

⁷ e.g. weekly, bi-weekly, monthly, etc

Attachment D: Reference Sheet

Agencies must select one or more descriptors from each the following categories for every monitor they operate: basic monitoring objectives, site type (referred to as monitoring objective types in AQS), monitor type, method code and parameter code. Since many of these parameters are related to each other, an Agency should choose a set of these descriptors that is consistent. This information is required for reporting data to AQS and should be included in the Annual Network Plan. See Attachment C for a recommendation of where to include this information in the Annual Network Plan.

Basic Monitoring Objectives (40 CFR 58 App. D 1.1)
(a) Provide air pollution data to public in a timely manner
(b) NAAQS comparison
(c) Research support

Acceptable AQS Coding for Site Types (40 CFR 58 App. D 1.1.1)
EXTREME DOWNWIND
HIGHEST CONCENTRATION
MAX OZONE CONCENTRATION
MAX PRECURSOR EMISSIONS IMPACT
POPULATION EXPOSURE
SOURCE ORIENTED
UPWIND BACKGROUND
GENERAL/BACKGROUND
REGIONAL TRANSPORT
WELFARE RELATED IMPACTS
QUALITY ASSURANCE
OTHER
Site types (monitoring objective types) can be found in the AQS coding manual (Section 5.4.8) at: http://www.epa.gov/ttn/airs/airsaqs/manuals/AQS%20Data%20Coding%20Manual.pdf

Acceptable AQS Coding for Monitor Types
IMPROVE
INDEX SITE
INDUSTRIAL
NATTS
NON-EPA FEDERAL
NON-REGULATORY
PAMS
PROPOSED NCORE
QA COLLOCATED
SLAMS
SPECIAL PURPOSE
SUPLMNTL SPECIATION
TRENDS SPECIATION
TRIBAL MONITORS
UNOFFICIAL PAMS
Monitor types can be found at: http://www.epa.gov/ttn/airs/airsaqs/manuals/codedescs.htm

Method Codes
Method codes can be found at: http://www.epa.gov/ttn/airs/airsaqs/manuals/codedescs.htm (see Protocols w/ Sampling Methodology).
Descriptions of FRM/FEM designations at http://www.epa.gov/ttn/amtic/criteria.html are also useful in selecting the appropriate

Parameter Codes
Parameter codes can be found at: http://www.epa.gov/ttn/airs/airsaqs/manuals/codedescs.htm (see Pollutant Codes).

Attachment E

The following information outlines the appropriate sampling frequency for required PM_{2.5} SLAMS described in 40 CFR 58.12(d). The sampling frequency of each PM_{2.5} monitor should be included in the detailed site information section of an Agency's Annual Network Plan (see Attachment C of this memo for a template which includes this information).

For quick reference, the PM_{2.5} sampling frequency requirements can be summarized as:

1. Manual PM_{2.5} FRMs at required SLAMS are required to operate at a 1-in-3 day schedule
 2. Agencies may request approval from the Regional Administrator for a reduction to a 1-in-6 day schedule for manual FRMs at required SLAMS stations which also have a continuous monitor operating.
 3. The 1-in-3 day schedule must be retained for the following required sites:
 - a. A required SLAMS that determine an area's design value and are within ± 10 percent of either the annual or the 24-hour NAAQS.
 - b. Any required site that exceeded the 24-hour NAAQS at one or more times a year for three years.
 4. An increase in frequency to a daily sampling schedule is required for required SLAMS that determine an area's design value and are within ± 5 percent of either the annual or the 24-hour NAAQS.
-

With respect to sampling frequency for PM_{2.5}, the full regulatory text in 40 CFR 58.12(d) states:

(1)(i) Manual PM_{2.5} samplers at required SLAMS stations without a collocated continuously operating PM_{2.5} monitor must operate on at least a 1-in-3 day schedule.

(ii) For SLAMS PM_{2.5} sites with both manual and continuous PM_{2.5} monitors operating, the monitoring agency may request approval for a reduction to 1-in-6 day PM_{2.5} sampling or for seasonal sampling from the EPA Regional Administrator. The EPA Regional Administrator may grant sampling frequency reductions after consideration of factors, including but not limited to the historical PM_{2.5} data quality assessments, the location of current PM_{2.5} design value sites, and their regulatory data needs. Required SLAMS stations whose measurements determine the design value for their area and that are within plus or minus 10 percent of the NAAQS; and all required sites where one or more 24-hour values have exceeded the NAAQS each year for a consecutive period of at least 3 years are required to maintain at least a 1-in-3 day sampling frequency. A continuously operating FEM or ARM PM_{2.5} monitor satisfies this requirement.

(iii) Required SLAMS stations whose measurements determine the design value for their area and that are within plus or minus 5 percent of the daily PM_{2.5} NAAQS must have an FRM or FEM operate on a daily schedule. A continuously operating FEM or ARM PM_{2.5} monitor satisfies this requirement.

(2) Manual PM_{2.5} samplers at NCore stations and required regional background and regional transport sites must operate on at least a 1-in-3 day sampling frequency.

(3) Manual PM_{2.5} speciation samplers at STN stations must operate on at least a 1-in-3 day sampling frequency.

Attachment F

This attachment clarifies how and when to determine the appropriate sampling frequency for PM₁₀ samplers required by 40 CFR 58.12(e). The sampling frequency of each PM₁₀ monitor should be included in the detailed site information section of an Agency's Annual Network Plan (see Attachment B of this memo for a template which includes this information).

With respect to sampling frequency for PM₁₀, 40 CFR 58.12(e) states (emphasis added):

For PM₁₀ samplers, a 24-hour sample must be taken from midnight to midnight (local standard time) to ensure national consistency. The minimum monitoring schedule for the site in the area of expected maximum concentration shall be based on the relative level of that monitoring site concentration with respect to the 24-hour standard as illustrated in Figure 1. If the operating agency demonstrates by monitoring data that during certain periods of the year conditions preclude violation of the PM₁₀ 24-hour standard, the increased sampling frequency for those periods or seasons may be exempted by the Regional Administrator and permitted to revert back to once in six days. The minimum sampling schedule for all other sites in the area remains once every six days. No less frequently than as part of each 5-year network assessment, the most recent year of data must be considered to estimate the air quality status at the site near the area of maximum concentration. Statistical models such as analysis of concentration frequency distributions as described in "Guideline for the Interpretation of Ozone Air Quality Standards," EPA-450/479-003, U.S. Environmental Protection Agency, Research Triangle Park, NC, January 1979, should be used. Adjustments to the monitoring schedule must be made on the basis of the 5-year network assessment. The site having the highest concentration in the most current year must be given first consideration when selecting the site for the more frequent sampling schedule. Other factors such as major change in sources of PM₁₀ emissions or in sampling site characteristics could influence the location of the expected maximum concentration site. Also, the use of the most recent 3 years of data might, in some cases, be justified in order to provide a more representative database from which to estimate current air quality status and to provide stability to the network. This multiyear consideration reduces the possibility of an anomalous year biasing a site selected for accelerated sampling. If the maximum concentration site based on the most current year is not selected for the more frequent operating schedule, documentation of the justification for selection of an alternative site must be submitted to the Regional Office for approval during the 5-year network assessment process. Minimum data completeness criteria, number of years of data and sampling frequency for judging attainment of the NAAQS are discussed in appendix K of part 50 of this chapter.

EPA interprets the "relative level of that monitoring site concentration" language in 40 CFR 58.12(e) to mean the design concentrations as defined in Section 6.3 of the *PM₁₀ SIP Development Guideline* (EPA-450/2-86-001). The guideline presents several acceptable approaches for determining appropriate 24-hour PM₁₀ design concentrations.

The most basic approach for determining a 24-hour PM₁₀ design concentration is presented in Section 6.3.1 of the guideline and referred to as the "Table look-up" procedure. To use this approach, it is necessary to know the total number of 24-hour PM₁₀ concentrations at the site over the three year design period and then select the design value from among the highest concentrations. The number of available 24-hour concentrations determines which of the highest concentrations is chosen as the design concentration. With multiple monitoring sites, the highest PM₁₀ concentrations at each site would have to be considered and a design concentration established for each location. For example, the "controlling" design concentration for an area with seven sites, each having 1,095 daily values, would be the highest of the seven fourth-highest values. Figure 1 describes the "Table look-up" procedure and can also be found in the guideline.

Figure 1: Table 6.1 from the *PM₁₀ SIP Development Guideline* (EPA-450/2-86-001).

TABULAR ESTIMATION OF PM₁₀ DESIGN CONCENTRATIONS

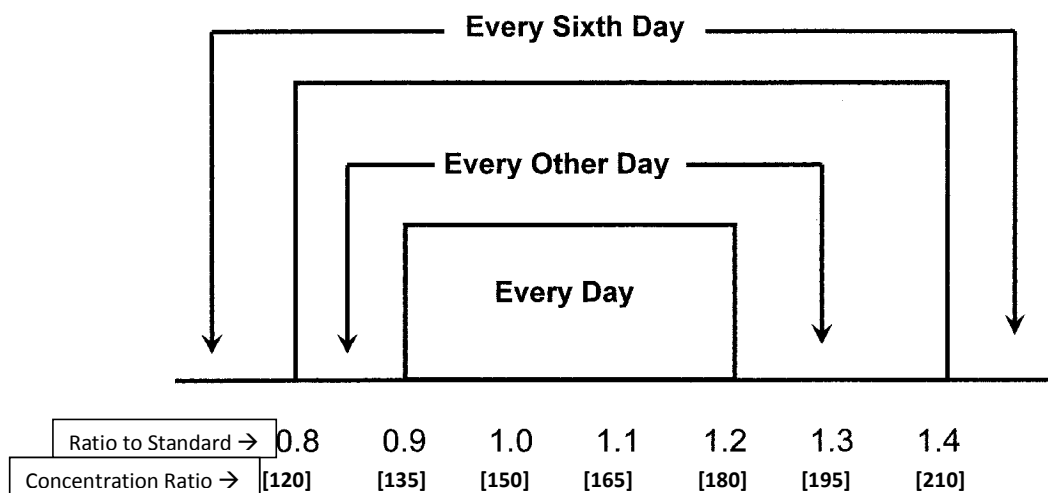
Number of Daily Values	Rank of Upper Bound	Rank of Lower Bound	Data Point Used for Design Concentration
< 347	-	1	Highest Value
348 - 695	1	2	Second Highest Value
696 - 1042	2	3	Third Highest Value
1043 - 1096	3	4	Fourth Highest Value

Figure 2 below (a modified version of Figure 1 from 40 CFR 58.12(e)) includes bracketed values which are the design concentration bounds that should be used to determine PM₁₀ sampling frequency. For example, if the sampler is operating on a 1 in 6 day schedule, the "design concentration" would be the highest value in that dataset. This would then be compared to the design value concentrations that correspond to the ratios to the standard (see Figure 2) to determine the required sampling frequency.

Figure 2: A modified version of Figure 1 from 40 CFR 58.12(e) which includes design value concentrations in brackets (bottom row of numbers) that correspond to the ratios to the standard (top row of numbers). (Ratios are calculated using the 24 hour standard, 150 µg/m³, and rounded to the nearest 10 µg/m³).

Comment [EF1]: Kate/Michael- I don't understand what this is saying and think it would benefit from some rewording.

Comment [KH2]: Is this the right place to put this??



ATTACHMENT G

This appendix lists the Annual Monitoring Network Plan Regulatory elements discussed in 40 CFR Part 58 as of August 21, 2011. Refer to the official, most recent 40 CFR Part 58 every year as new modifications are regularly incorporated.

40 CFR 58.10 states:

(a)(1) Beginning July 1, 2007, the State, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance system that consists of a network of SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations. The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA.

(2) Any annual monitoring network plan that proposes SLAMS network modifications including new monitoring sites is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, and has submitted the received comments together with the plan, the Regional Administrator is not required to provide a separate opportunity for comment.

(3) The plan for establishing required NCore multipollutant stations shall be submitted to the Administrator not later than July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.

(4) A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting 1.0 tpy or greater shall be submitted to the EPA Regional Administrator no later than July 1, 2009, as part of the annual network plan required in paragraph (a)(1) of this section. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting 1.0 tpy or greater to be operational by January 1, 2010. A plan for establishing source-oriented Pb monitoring sites in accordance with the requirements of appendix D to this part for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy shall be submitted to the EPA Regional Administrator no later than July 1, 2011. The plan shall provide for the required source-oriented Pb monitoring sites for Pb sources emitting equal to or greater than 0.50 tpy but less than 1.0 tpy to be operational by December 27, 2011.

(5) A plan for establishing NO₂ monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the Administrator by July 1, 2012. The plan shall provide for all required monitoring stations to be operational by January 1, 2013.

(6) A plan for establishing SO₂ monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator by July 1, 2011 as part of the annual network plan required in paragraph (a) (1). The plan shall provide for all required SO₂ monitoring sites to be operational by January 1, 2013.

(7) A plan for establishing CO monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator. Plans for required CO monitors shall be submitted at least six months prior to the date such monitors must be established as required by section 58.13.

With respect to CO monitoring network completion, 40 CFR 58.13(e) states that “CO monitors required under Appendix D, section 4.2 of this part must be physically established and operating under all of the requirements of this part, including the requirements of appendices A, C, D, and E to this part, no later than: (1) January 1, 2015 for

CO monitors in CBSAs having 2.5 million persons or more; or (2) January 1, 2017 for other CO monitors”. This means that a plan for CO monitoring sites due for operation on January 1, 2015, is due to EPA on July 1, 2014 and a plan for CO monitoring sites due for operation on January 1, 2017, is due to EPA on July 1, 2016.

The remainder of Part 58.10 continues:

(b) The annual monitoring network plan must contain the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in §58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(9) The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 CFR part 58.

(10) Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.

(11) Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb- PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

(12) The identification of required NO_2 monitors as either near-road or area-wide sites in accordance with appendix D, section 4.3 of this part.

(c) The annual monitoring network plan must document how States and local agencies provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor or the creation/change to a community monitoring zone, including a description of the proposed use of spatial averaging for purposes of making comparisons to the annual $PM_{2.5}$ NAAQS as set forth in appendix N to part 50 of this chapter. The affected State or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

(d) The State, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for

any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby States and Tribes or health effects studies. For PM_{2.5}, the assessment also must identify needed changes to population-oriented sites. The State, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The first assessment is due July 1, 2010.

(e) All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic network assessments are subject to approval according to §58.14.

Per 40 CFR 58.10(a)(1), agencies must provide “evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E” to 40 CFR 58, where applicable. EPA recommends the expanded list of information below to be included in the network plan to provide evidence of compliance with this requirement. From each of the 40 CFR 58 Appendices, include the following:

Appendix A

- Were Precision/Accuracy reports submitted to AQS for data year covered by the plan?
- Was an annual data certification package submitted for the data year covered by the plan?
- What was the frequency of flow rate verification for manual PM sampler audits?
- What was the frequency of flow rate verification for automated PM analyzer audits?
- What was the frequency of one-point QC checks for gaseous instruments?
- When was the last Annual Performance Evaluation conducted for gaseous instruments?
- When were the last two semi-annual flow rate audits for manual and automated PM monitors?
- When did PEP audits occur during the data year covered by the plan?
- When did NPAP audits occur during the data year covered by the plan?

Appendix C

- What is the instrument manufacturer and model used for each monitor?
- What is the start date of each monitor?

Appendix D

- What is the sampling season for each parameter?
- Does the network meet minimum number of monitors required?
 - For each pollutant consider MSA, population, design value, # required, # operating.
 - May include a map displaying the location of monitoring sites.

Appendix E

- For each site:
 - What is the distance from nearest road in meters?
 - What is the traffic count of nearest road?
 - What is the surrounding groundcover (e.g. paved, vegetated, gravel, etc.)?
- For each monitor:
 - What is the probe height in meters?
 - If there is one, what is the distance from the nearest supporting structure in meters?
 - If there is one, what is the distance from the nearest obstruction on the roof in meters?
 - If there is one, what is the distance from the nearest obstruction not on the roof in meters?
 - What is the nearest distance from an obstructive tree in meters?
 - If there is one, what is the distance from the nearest furnace or incinerator flue in meters?
 - If there is one, what is the distance between collocated monitors?
 - What is the unrestricted airflow in degrees?
 - What is the probe material for reactive gases (i.e. O₃, NO₂, and SO₂)?
 - What is the residence time for reactive gases?